

Elasticity

Warning – things are about to get mathy!

price elasticity of demand: the responsiveness of quantity demanded of a good to a change in price

$$E_d = \frac{\frac{\Delta Q}{(Q + Q_1) / 2}}{\frac{\Delta P}{(P + P_1) / 2}}$$

Also written as
PED

- $E_d > 1$, then the price elasticity of demand is elastic
 - $\% \Delta Q_D > \% \Delta P$
- $E_d = 1$, then the price elasticity of demand is unit elastic
 - $\% \Delta Q_D = \% \Delta P$
- $E_d < 1$, then the price elasticity of demand is inelastic
 - $\% \Delta Q_D < \% \Delta P$

So what?

- If the demand for a good or service is elastic, producers will make less **Total Revenue** ($TR = \text{price} \times \text{quantity}$) if they increase prices.
- If the demand for a good or service is elastic, producers will make more **TR** if they decrease prices.

- If the demand for a good or service is inelastic, producers will make less **TR** if they decrease prices.
- If the demand for a good or service is inelastic, producers will make more **TR** if they increase prices.

Elasticity Coefficient	Term	$\% \Delta QD$ vs. $\% \Delta P$	TR if price increases	TR if price decreases
$E_d > 1$	Elastic	$\% \Delta QD > \% \Delta P$	TR ↓	TR ↑
$E_d = 1$	Unit elastic	$\% \Delta QD = \% \Delta P$	no Δ	no Δ
$E_d < 1$	Inelastic	$\% \Delta QD < \% \Delta P$	TR ↑	TR ↓

Determinants of Price Elasticity of Demand

- Availability of substitutes
 - How easy is it to switch to something else?
 - Easy to switch, elastic.
 - Difficult to switch, inelastic.

- Price relative to income

- How much of your income does the good or service take up?
- If small, inelastic.
- If a lot, elastic.

- Necessities and luxuries

- Do you need it?
- Need it, inelastic.
- Don't need it, elastic.

- Urgency of purchase

- Do you need it now, or can you shop around?
- Need it now, inelastic.
- Can wait, elastic.

WARNING:

Elasticity changes along the curve, so you cannot assume the elasticity of a curve based on its slope!*

You must do the calculations to be sure!

* although curves with different slopes are used to show different elasticities

income elasticity of demand: the responsiveness of quantity demanded of a good to a change in income

$$E_i = \frac{\% \Delta Q_D}{\% \Delta I}$$

Also written as
YED


So what?

- If the income elasticity of demand is positive the product is a normal or superior good.
- If the income elasticity of demand is negative the product is an inferior good.

cross elasticity of demand: the responsiveness of one good's quantity demanded to changes in the price of another good

$$E_{xy} = \frac{\% \Delta Q_{DX}}{\% \Delta P_Y}$$

Also written as
XED or
Cross PED



So what?

- If the cross elasticity of demand is positive the two goods are substitutes.
- If the cross elasticity of demand is negative the two goods are compliments.
- If the cross elasticity of demand is zero (or close to zero) the two goods are unrelated.

price elasticity of supply: the responsiveness of quantity supplied of a good to a change in price

$$E_s = \frac{\frac{\Delta Q}{(Q + Q_1) / 2}}{\frac{\Delta P}{(P + P_1) / 2}}$$

Also written as
PES

- $E_s > 1$, then the price elasticity of supply is elastic
 - $\% \Delta Q_s > \% \Delta P$
- $E_s = 1$, then the price elasticity of supply is unit elastic
 - $\% \Delta Q_s = \% \Delta P$
- $E_s < 1$, then the price elasticity of supply is inelastic
 - $\% \Delta Q_s < \% \Delta P$

So what?

- If the supply for a good or service is elastic, the easier and more rapidly producers can shift resources between alternative uses to produce more or less of the product.
- If the supply for a good or service is inelastic, producers cannot shift resources between alternative uses easily and rapidly.

Determinants of Elasticity of Supply

- Time to increase capacity
 - Two weeks, elastic.
 - Two years, inelastic.

- Availability of input substitutes

- Lots of substitutes, elastic.
- No substitutes, inelastic.

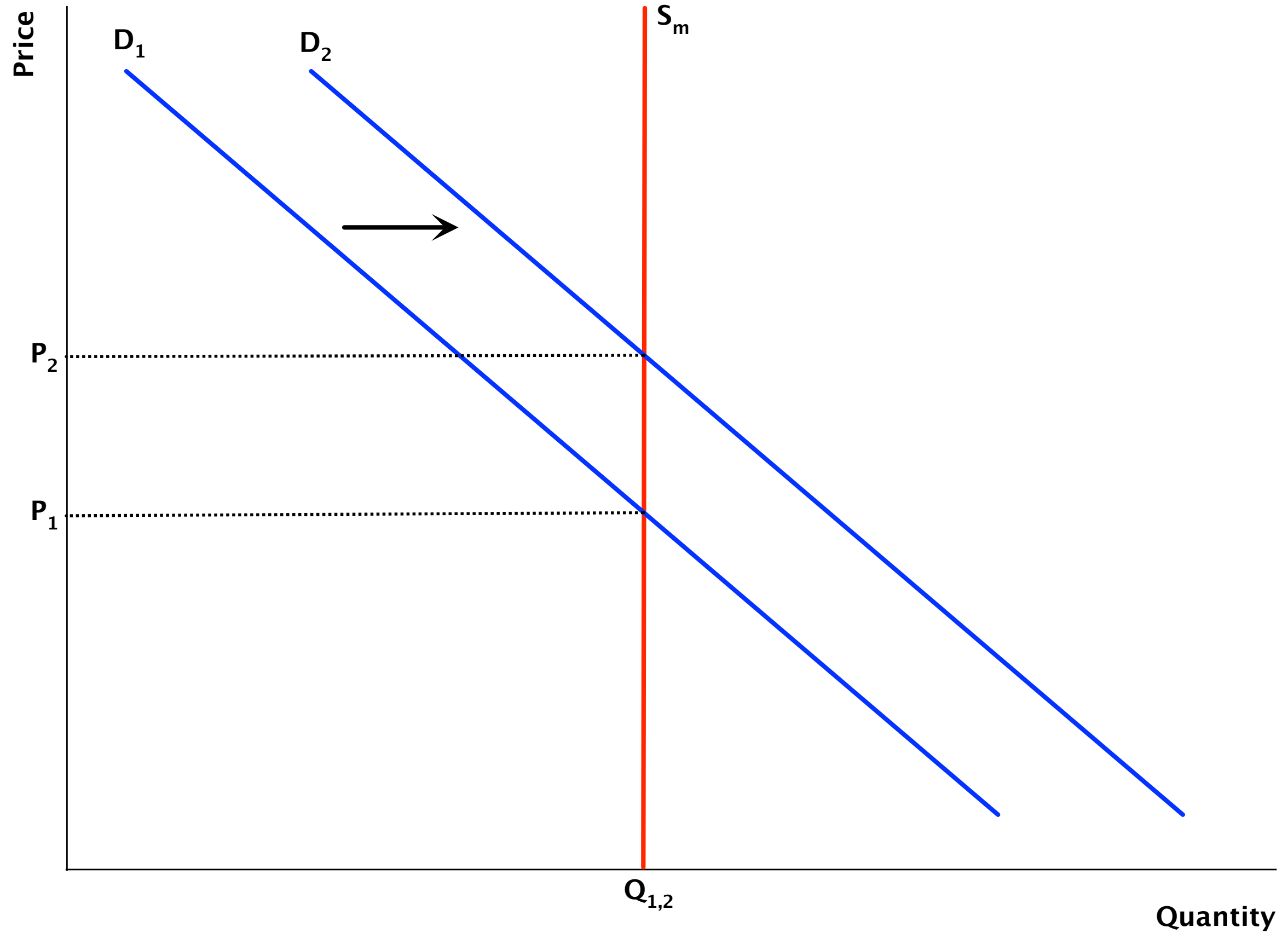
- Closeness of producer substitutes

- Close substitutes, elastic (milk, butter, cheese).
- Not close substitutes, inelastic (copper and paper).

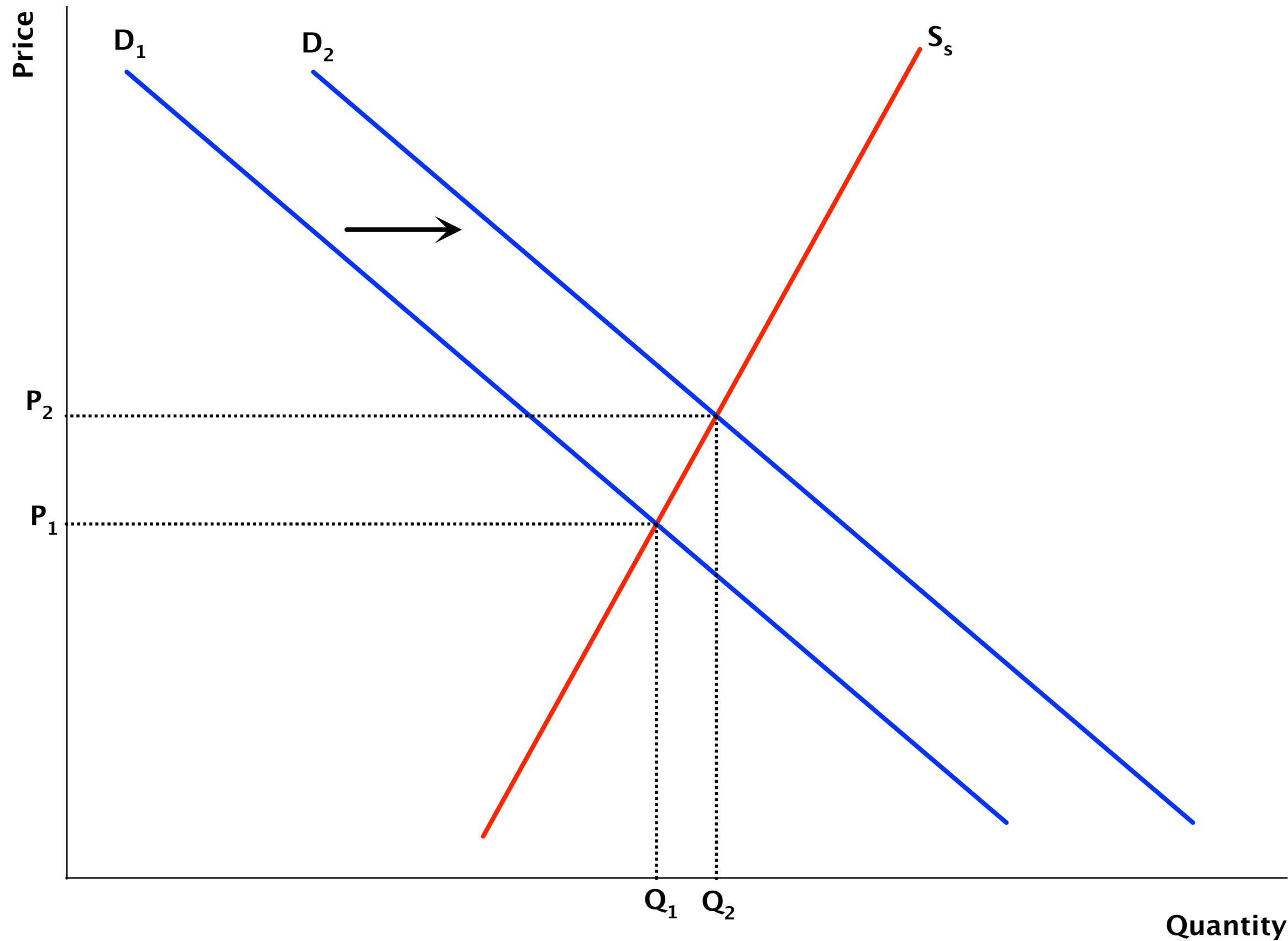
- Unused capacity

- Lots of unused capacity, elastic.
- Not a lot of unused capacity, inelastic.

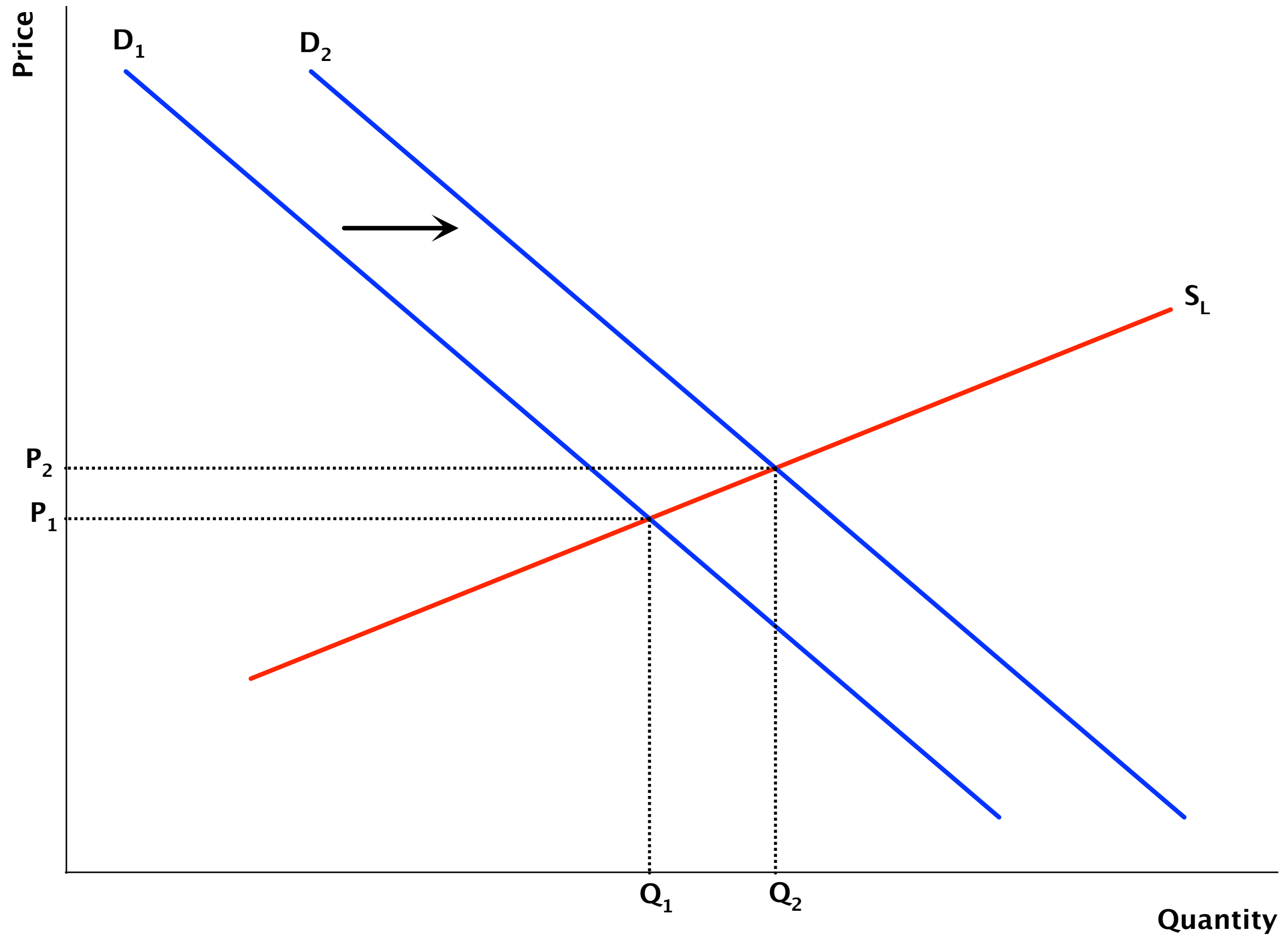
market period



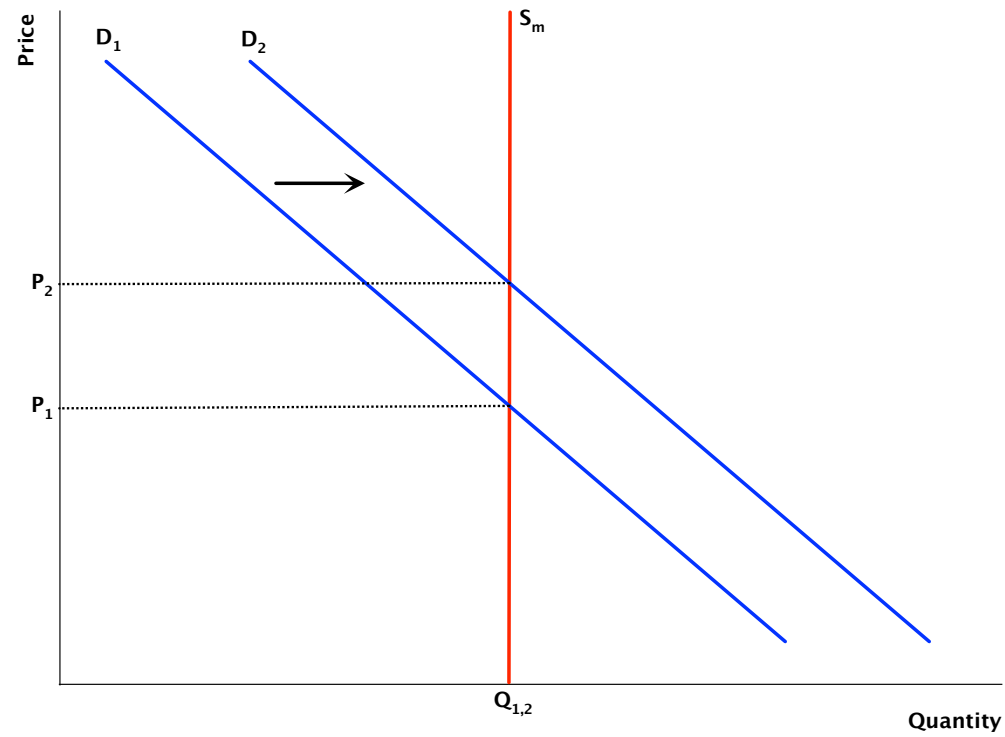
short run



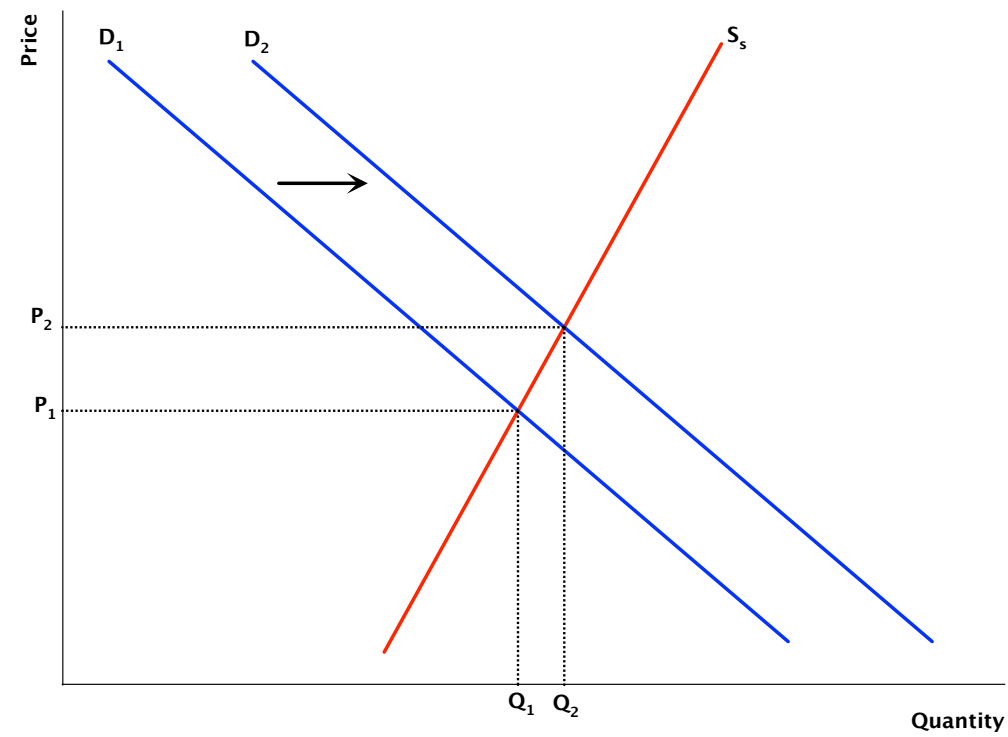
long run



market period



short run



long run

